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Tobacco Marketing in California Retail Outlets, 2000-2005: How the Retail Environment has Changed Over Time and How Community Characteristics Shape it

Prepared for
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Executive Summary

Objective: Cigarette companies spend more of their marketing dollars in retail outlets than in any other venue. In 2003, they spent 85 percent of $15.1 billion to advertise and promote the sale of their products in stores. The purposes of this study were to document the extent of tobacco marketing materials in a sample of California stores that sold tobacco in 2005; to study pricing strategies of three premium and three discount cigarette brands; to identify how the amount and types of cigarette marketing materials have changed in California between 2000 and 2005; and to assess community influences on cigarette marketing in stores.

Methods: Five observational assessments of cigarette marketing materials were conducted in approximately 600 California stores that sold cigarettes from 2000 to 2005. Trained observers collected data on the amount, placement, and type of branded cigarette marketing materials, including advertisements, product shelving and displays, and functional items. Longitudinal analyses were performed to estimate trends over time and identify correlates of change in the amount and type of tobacco advertising.

Results: In 2005, an average of 24.9 cigarette marketing materials was observed in California stores. More than two-thirds of the stores had at least one marketing material located at a height less than three feet. Only 71 percent of stores posted Stop Tobacco Access to Kids Enforcement (STAKE) Act signage by the cash register, as required by state law. Slightly fewer than 60 percent of the stores had licenses posted in a visible location. The price of a single pack of premium cigarettes differed significantly by brand and by store type, whereas the price of discount brands did not vary significantly. The number of cigarette marketing materials increased as price decreased. The mean number of cigarette marketing materials increased significantly over time for some store types, and the annual rate of change varied across stores. Store type accounted for some, but not all, of the variation in the rate of change. The mean number of cigarette displays significantly decreased over time and the rate of change varied by store type. From 2002 to 2005, the percent of stores with at least one advertisement (ad) for a special price or multi-pack discount increased from 68 percent to 79 percent. Stores located in neighborhoods with a greater proportion of African Americans than the statewide average contained more marketing materials even after controlling for store type. Similar relationships were not found in neighborhoods with greater proportions of Asian/Pacific Islanders, Hispanics or non-Hispanic whites. The results indicate that cigarette companies vary their marketing strategies in retail outlets over time.

Conclusion: A variety of strategies should be considered to restrict cigarette company marketing practices in stores, including the following: pursue federal and/or state authority over tobacco industry marketing practices in stores, explore the feasibility of a minimum price law in California, continue efforts to increase retailer compliance with California's STAKE Act and licensing laws, and continue to encourage local programs to pursue adoption and enforcement of local sign laws and zoning restrictions on the density and location of new stores selling tobacco.

Introduction and Background

Cigarette manufacturers in the United States spend the majority of their marketing and promotion dollars in retail stores, an environment relatively free of regulation. There are no federal laws restricting retail tobacco advertising. However, the Federal Cigarette Labeling and Advertising Act (FCLAA) preempts state and local jurisdictions from placing restrictions on cigarette advertising but not on smokeless tobacco or cigar advertising (*Lorillard Tobacco Co. v. Reilly*). The Master Settlement Agreement (MSA) of 1998 between attorneys general from 46 states and the cigarette companies eliminated billboard and transit cigarette advertising, and restricted sponsored events by cigarette companies, but placed only one restriction on advertising in retail outlets: the size of any individual sign is limited to a maximum of 14 square feet. A similar agreement was also reached with one manufacturer of smokeless tobacco, the U.S. Smokeless Tobacco Company (USST). One California state law, Business and Professions (B&P) Code 22962, limits self-service displays of all tobacco products to stores only accessible to adults.

Since 1985, cigarette companies have spent a higher proportion of their marketing and promotional dollars in retail outlets than in any other venue. In 1997, the year prior to the signing of the MSA, cigarette companies spent about 66 percent of their $5.6 billion budget to market their products in stores (Federal Trade Commission, 2005). By 2003, total expenditures had more than doubled, and the proportion of retail marketing dollars increased to 85 percent of $15.1 billion. Retail expenditures include point-of-sale advertising, price discounts to merchants, and retail value-added items such as multi-pack discounts (Federal Trade Commission, 2005).

Smokeless tobacco sales of $7 billion represent a small portion of tobacco sales overall. Nevertheless, smokeless sales volume increased by 4.3 percent through the first three quarters of 2005, and grew by as much as six percent in 2004 (Beirne, 2005). This fact raises concerns because smokeless tobacco companies, particularly USST, have a long history of engaging in marketing that attracts children (Tobacco-Free Kids, 2003). In 2003, nearly one in seven high school boys in the United States used smokeless tobacco, and in some states it was more than one in four (Tobacco-Free Kids, 2003).

Smokeless tobacco marketing expenditures have grown as a whole, and the portion spent in the retail environment has also increased. The Federal Trade Commission (FTC) does not require annual reports from smokeless tobacco manufacturers so data about their marketing expenditures are not as current as for cigarette manufacturers. However, the most recent FTC report on smokeless tobacco indicates overall increases in marketing expenditures as well as increases in point-of-sale expenditures from 1998, the year in which USST signed the MSA, to 2001. In 1998, smokeless tobacco marketing in stores via point-of-sale, promotional allowances, and retail-value-added, comprised 22 percent of its $145.5 million marketing budget. Just three years later, in 2001, these line items had increased to 51 percent of the company's $236.7 million marketing expenditures.

Marketing expenditures in this venue are effective. Consumers recall in-store advertising for almost 30 percent of the products they purchase, with cigarettes enjoying one of the highest recall rates (POPAI, 2002). Importantly, sales increase dramatically when brands are displayed and featured with a price cut (Liljenwall and Maskulka, 2001); this strategy can boost sales by up to 30 percent (PROMO, 2000). Adolescents reporting frequent exposure to retail tobacco marketing had more positive attitudes and beliefs about smoking (Donovan, Jancey, and Jones, 2002; Henriksen et al., 2002; Wakefield et al., 2002), and were more likely to have experimented with smoking (Henriksen et al., 2004a; Redmond, 1999; Schooler, Feighery, and Flora, 1996). Teen smokers also prefer the brand most heavily advertised in the convenience store closest to their school (Wakefield et al., 2002).

California has long recognized that marketing in the retail channel is important to cigarette companies. In 1994, the California Department of Public Health (CDPH), California Tobacco Control Program (CTCP) launched Operation Storefront, a statewide campaign to document the amount of advertising in stores and to stimulate awareness and take action to reduce tobacco advertising in this venue (Rogers et al., 1995). Since then, CTCP has funded statewide surveys to track the extent of tobacco industry marketing in stores. Statewide store surveys were initiated by researchers at Stanford University in 1997 and repeated in 1999. In 2000, store survey protocols were substantially modified and have continued to be used for subsequent statewide surveys.

The aims of this report are as follows:

- describe the amount and types of cigarette and smokeless tobacco marketing materials in a random sample of California stores that sold cigarettes in 2005;
- study pricing strategies of three premium and three discount cigarette brands;
- examine trends in the amount and type of cigarette advertising from 2000-2005; and
- assess community influences on cigarette marketing in stores.

Evaluation Methods

This study used data from the California Tobacco Assessment Study (CTAS), a longitudinal prospective cohort study of California stores that sell tobacco. Between 2000 and 2005, standardized observations of tobacco-related marketing materials in retail outlets were made at five time points (2000, and annually from 2002 to 2005). Additionally in 2005, data was collected on six cigarette brand prices and on retailer participation in cigarette company incentive programs.

Sample

This study uses data collected at five time points between the years 2000 and 2005. The 2000 sample was based on a previous sample selected in 1997 by Stanford University. In 1997, Stanford University randomly selected 700 stores throughout California that sold cigarettes. The sampling frame consisted of 40,186 stores identified as selling tobacco per a list provided by the California Board of Equalization (BOE). In 1999, Stanford University researchers attempted to collect standardized observations of

tobacco-related marketing materials ("store observations") for the 626 stores that were in the initial BOE sample of 700 and were still in business. Store observation data was successfully collected in 586 of these 626 stores. These 586 stores served as the baseline sample for the current study.

The first assessment in the current study was conducted in 2000 described above by Feighery et al., with Stanford University, and consisted of the 586 randomly selected stores. From 2002 to 2004, three more assessments were completed annually by Cruz et al. at the University of Southern California as part of the Tobacco Industry Monitoring Evaluation (TIME) project. In 2002, TIME revisited 541 stores with complete store observations from the first time point (2000) that were still selling tobacco. An additional 78 randomly selected stores were added to the 2002 sample to replace stores no longer in business or no longer selling cigarettes, yielding a 2002 sample size of 619 stores. From 2002 to 2004, the TIME project attempted annually to collect store observations in all of these 619 stores. During this time period, stores identified by telephone verification as "no longer in business" were replaced with new randomly selected stores. The last assessment was conducted in 2005 by Feighery et al., with the Public Health Institute. In 2005, CTAS attempted to collect store observation data in all stores with complete data for 2004. As in other years, the 2005 sample was replenished with randomly selected stores in place of the stores identified as "no longer in business" by data collectors in the field.

As part of the CTAS study, store observation data collection was attempted in 613 stores from the longitudinal cohort between March 5 and April 18, 2005. Some of these stores were from the original CTAS sample of 586, others were added to the sample from 2002 to 2004 by TIME, and still others added to the sample in 2005 by CTAS. In 2005, 698 store visits were made in an attempt to complete the store observation data collection. Of these 698 visits, 85 were repeat visits to stores to collect data for reliability assessment purposes. Data collectors were not allowed to complete surveys in three percent of the stores.

Training

Six data collectors were trained using a combination of classroom and field training. The training protocol was based on materials from previous data collections as part of CTAS 2000 and the TIME project, and material new to the 2005 data collection. The three-day training included one day of in-store practice with a training supervisor.

Measures

Stores were classified into one of seven store types: chain convenience with gasoline, chain convenience without gasoline, drug store, gasoline only, liquor store, small market, and supermarket.

Tobacco marketing materials were classified as one of four types: two types of branded merchandising fixtures and two types of branded advertising items. The merchandising

fixture category included: large shelving units with at least one sign used to merchandise packs and cartons of tobacco products (hereafter referred to as "shelving units"), and portable displays that held packs or tins of tobacco products ("displays"). Included in the advertising item category were interior and exterior signs (e.g., posters and banners), and interior and exterior functional items (branded items serving a utilitarian purpose, such as trashcans and coin trays). Minimum age-of-sale warning signs provided by tobacco companies were not counted as marketing materials.

Below is a summary of data collected for overall store characteristics, age-of-sale warning signs, and the four types of tobacco marketing materials:

Overall Store Characteristics • Date of visit • Store type • Number of cash registers • Tobacco retailer license posted in a visible location • Presence of self-service by product type (cigarettes, smokeless tobacco, and cigars) • Bidis sold
Age-of-Sale Warning Signs For each age-of-sale warning sign: • Type: We Card, 1-800-5ASK4ID, signs produced by tobacco companies, and other signs • Location: exterior and interior (near* and away from counter)
Functional Items For each functional item: • Brand • Location: exterior and interior (near* and away from counter) • Presence of any item at or below height of three feet
Tobacco Signs For each sign: • Brand • Promotions by type (special price, multi-pack discount, and free gift) • Location: exterior and interior (near* and away from counter) • Size characteristics (small hanging tags) • Presence of any item at or below height of three feet, within six inches of candy
Displays For each display: • Brand • Promotional information (special price, multi-pack discount, and free gift) • Location: interior (near* and away from counter) • Presence of any item at or below height of three feet, within six inches of candy

Shelving Units

For each shelving unit:

- Brand
- Location: interior (near* and away from counter)
- Presence of any item at or below height of three feet, within six inches of candy

* Near counter is within four feet of the counter area.

A list of brand names was provided for the coder to identify the brand items in the store. The following brands from tobacco manufacturers were included on this survey:

Philip Morris:	Marlboro, Basic, Other
R.J. Reynolds:	Camel, Doral, Other
Lorillard:	Newport, Other
Brown & Williamson:	GPC, Other
Other Cigarette Brands:	
Smokeless tobacco:	Copenhagen, Skoal, Other

Beginning in 2005, the price for a single pack of cigarettes was also recorded for six different brands: three top selling premium brands (Camel, Marlboro, and Newport) and three top selling discount brands (Basic, Doral, and GPC). Data collectors recorded the price of each brand and noted whether the recorded price was for an individual pack or a bundle of packs. If the price recorded was for a bundle, the number of free packs was noted. Also noted was whether or not the price included sales tax. Before analysis, all prices were converted to that of a single pack without sales tax. (See the Appendix for the store observation survey instrument.)

To assess the relationship between the retail environment, cigarette prices, and neighborhood characteristics, descriptive census data were used for the neighborhood in which each store was located, defined as census tract. The location of each store was geocoded and corresponding census tract data was extracted for each store by a group specializing in Geographic Information Systems (GIS). Neighborhood characteristic variables of interest included the following: quartile of population density, quartile of proportion of population under 18 years of age, above average proportion of four race/ethnicity groups: African Americans, Asian/Pacific Islanders, Hispanics, and non-Hispanic whites, and a composite measure of socio-economic status (SES). The race/ethnicity variables were dichotomous measures indicating whether the proportion of a particular group within a census tract was greater than the statewide proportion of that group. For example, the above average proportion indicated whether the proportion of African Americans in the census tract was above the statewide proportion of African Americans (seven percent). The SES variable was a composite measure created using the first principal component of the following standardized census variables: median family income, median household income, median housing value, proportion of crowded housing units (1.5 or more persons per room), proportion of population over age 25 without a high school diploma, proportion of population living below the poverty level, and proportion of population unemployed.

Cross-sectional Results from the 2005 Store Observation Surveys

The cross-sectional results are divided into four sections:

- a descriptive analysis of the amount and type of cigarette and smokeless tobacco marketing materials in a sample of California stores that sold cigarettes in 2005;
- a descriptive analysis of store compliance with California laws that regulated tobacco sales;
- a study of prices of three premium and three discount brands; and
- an examination of the relationship between neighborhood characteristics and the retail environment.

Amount and Types of Cigarette and Smokeless Tobacco Marketing Materials in California Stores in 2005

Because the MSA curtailed the cigarette companies' use of more traditional advertising venues such as billboards, the retail outlet has become the most important communication channel with current and future smokers. This venue has the potential to reach more consumers than traditional venues such as magazines because it serves to expose all shoppers, regardless of age or smoking status, to pro-smoking messages that project powerful cues to smoke and that stimulate cigarette purchases (Rogers et al., 1995; Warner, 1986). In 2002, a national tobacco monitoring, research, and evaluation workshop of experts was convened by the Centers for Disease Control and Prevention, the Robert Wood Johnson Foundation, and the National Cancer Institute to develop recommendations to strengthen the nation's system for monitoring factors that can impact morbidity and mortality from tobacco use. One recommendation that emerged from this meeting was to develop a national surveillance system to monitor tobacco marketing and promotion activities such as pricing strategies, retail environment advertising, and promotional allowances to stores. The 2005 store observation survey reflects a continued commitment by the CTCP to regularly monitor how and the extent to which tobacco companies are using retail outlets in California to promote their products.

Research Questions

1. *What is the state rate of type, amount, and placement of tobacco advertising materials in retail outlets by major brand and company?*

2. *How are the sales of tobacco products promoted (special price, multi-pack discount, free gift)?*

3. *How widespread are placement practices of stores (by store type) that increase the likelihood of visibility to children?*

4. *What is the level of compliance with state laws (e.g., sale of bidis, licensing requirements, self-service display bans)?*

5. *Is there a relationship between compliance with the STAKE Act signage law and the amount and placement of tobacco advertising materials?*

6. *Is there a relationship between compliance with other state laws and the amount and placement of tobacco advertising materials?*

7. *Is there a relationship between store type and compliance with state laws?*

Analysis

Using the 2005 cross-sectional data, descriptive statistics for each type of marketing material and selected characteristics of these materials were computed by major brand and by company for the four largest United States cigarette companies (Philip Morris, R.J. Reynolds, Brown & Williamson, and Lorillard). In 2004, R.J. Reynolds and Brown & Williamson merged to form Reynolds American. Therefore, it could be argued that in 2005 there were three major United States cigarette companies. However, for consistency with previous years, R.J. Reynolds and Brown & Williamson were treated as separate companies. Statistics were computed for each type of marketing material, with one exception. Interior and exterior functional items were collapsed into one category because of infrequent observations.

To assess cigarette promotions, descriptive statistics were computed for each type of promotional signage (special price, multi-pack discount, free gift) by brand and company. Additionally, the percentage of stores with at least one sign with a cigarette promotion was computed, where promotion was defined as special price and/or multi-pack discount. "Free gift" was dropped from these analyses due to infrequent observation.

Descriptive statistics were generated by store type for the different types of marketing materials, age-of-sale warning signs, compliance with tobacco laws, and presence of marketing materials within three feet from the floor. Note that analysis of compliance with state laws was for all tobacco products, not just cigarettes.

Analysis of smokeless tobacco marketing materials was restricted to those stores with at least one smokeless tobacco marketing item (n = 279). By restricting the analysis sample size, means were not sensitive to values of zero for stores that did not sell smokeless products. Because of infrequency of observations, the percent of stores with at least one of each type of marketing material (instead of means) was used to summarize data for different types of smokeless marketing materials. Summary statistics for smokeless tobacco marketing materials by company are presented in two categories: interior signs and total marketing materials.

To assess whether there was a relationship between compliance with state laws for tobacco retailers and amount of tobacco marketing materials, the mean number of marketing materials by compliance status for each of the three laws of interest was computed. Two-way ANOVA models were used to test for differences in the mean

number of marketing materials for each law studied. The two factors in the ANOVA models were compliance with the specific law and store type. To explore a relationship based on level of compliance, a variable indicating the number of laws for which a store was out of compliance was computed and split by total marketing materials.

Results: Cigarette marketing materials

Key findings for 2005:

- An average of 24.9 cigarette marketing materials was observed in California stores; most were found inside the stores, an average of 19.2 signs per store.
- Almost half (46 percent) of all marketing materials were for Philip Morris brands.
- About one-third of all signs advertised a promotion and 80 percent of the stores displayed at least one sign with a promotion.
- About 60 percent of all interior marketing materials were within four feet of a counter.
- A little more than two-thirds of the stores had at least one marketing material below three feet.

Table 1 describes the state rate of the type, amount, and placement of tobacco advertising materials in retail outlets by major brand and company. In 2005, there was an average of 24.9 cigarette marketing materials in the sample of stores for which complete data were available. Most of these materials were inside the stores in the form of branded interior signage averaging 19.2 signs per store. There was more advertising for Marlboro, 6.6 marketing materials per store, than for any other brand for which individual brand data were collected; the second most heavily advertised brand was Camel, with an average of 3.4 materials per store. This pattern was the same for the companies that produce these brands: 46 percent of all marketing materials were for Philip Morris brands and 23 percent were for brands made by R.J. Reynolds.

Table 1. Descriptive Statistics for Amount and Placement of Cigarette Marketing Materials by Brand and Company, 2005 (n = 574 stores)

		Shelving Units		Displays		Interior Signs		Exterior Signs		Interior and Exterior Functional Items		Total Marketing Materials	
		n	mean (SD*)	n	mean (SD)	n	mean (SD)	n	mean (SD)	n	mean (SD)	n	mean (SD)
Philip Morris	Marlboro	532	0.9 (1.1)	95	0.2 (0.5)	2,599	4.5 (7.2)	512	0.9 (2.0)	50	0.1 (0.3)	3,788	6.6 (7.9)
	Other PM	19	0.0 (0.2)	14	0.0 (0.2)	2,592	4.5 (9.3)	143	0.2 (1.3)	13	0.0 (0.2)	2,781	4.8 (9.3)
	All PM	**551**	**1.0 (1.1)**	**109**	**0.2 (0.5)**	**5,191**	**9.0 (16.1)**	**655**	**1.1 (2.8)**	**63**	**0.1 (0.4)**	**6,569**	**11.4 (16.7)**
R.J. Reynolds (RJR)	Camel	129	0.2 (0.5)	28	0.0 (0.3)	1,290	2.2 (3.4)	467	0.8 (1.8)	41	0.1 (0.3)	1,955	3.4 (4.8)
	Other RJR	23	0.0 (0.3)	17	0.0 (0.2)	1,164	2.0 (3.7)	161	0.3 (1.1)	17	0.0 (0.2)	1,382	2.4 (4.0)
	All RJR	**152**	**0.3 (0.6)**	**45**	**0.1 (0.4)**	**2,454**	**4.3 (6.5)**	**628**	**1.1 (2.6)**	**58**	**0.1 (0.4)**	**3,337**	**5.8 (8.1)**
Lorillard	Newport	31	0.1 (0.2)	42	0.1 (0.3)	803	1.4 (2.6)	190	0.3 (0.8)	26	0.0 (0.3)	1,092	1.9 (3.4)
	Other Lorillard	2	0.0 (0.1)	16	0.0 (0.2)	282	0.5 (1.5)	37	0.1 (0.3)	2	0.0 (0.1)	339	0.6 (1.6)
	All Lorillard	**33**	**0.1 (0.2)**	**58**	**0.1 (0.5)**	**1,085**	**1.9 (3.7)**	**227**	**0.4 (1.0)**	**28**	**0.0 (0.3)**	**1,431**	**2.5 (4.6)**
Brown and Williamson (B&W)	GPC	0	0.0 (0.0)	3	0.0 (0.1)	94	0.2 (1.2)	5	0.0 (0.1)	25	0.0 (0.2)	127	0.2 (1.2)
	Other B&W	40	0.1 (0.3)	31	0.1 (0.3)	1,610	2.8 (6.2)	224	0.4 (1.0)	23	0.0 (0.2)	1,928	3.4 (6.4)
	All B&W	**40**	**0.1 (0.3)**	**34**	**0.1 (0.3)**	**1,704**	**3.0 (6.8)**	**229**	**0.4 (1.0)**	**48**	**0.1 (0.3)**	**2,055**	**3.6 (7.0)**
Other Cigarette Companies		**5**	**0.0 (0.1)**	**68**	**0.1 (0.5)**	**614**	**1.1 (2.0)**	**226**	**0.4 (1.2)**	**3**	**0.0 (0.1)**	**916**	**1.6 (2.9)**
All Cigarette Companies		**781**	**1.4 (1.4)**	**314**	**0.5 (1.1)**	**11,048**	**19.2 (29.5)**	**1,965**	**3.4 (6.2)**	**200**	**0.3 (0.9)**	**14,308**	**24.9 (31.1)**

Note: Because there were so few marketing materials for Basic (PM), Doral (RJR), these were clustered with the other brands for their parent companies. Because there were so few functional items, interior and exterior functional items were combined.
*Standard Deviation (SD)

The data presented in Table 2 show that there was more advertising for special prices than for multi-cigarette-pack discounts, with an average of 6.3 signs per store for special prices compared to 1.6 signs for multi-pack discounts. Of all tobacco-related signs in stores, 34.8 percent advertised a promotion; and 79.4 percent of the stores displayed at least one sign with a cigarette promotion.

Table 2. Descriptive Statistics for Signs with a Cigarette Promotion by Brand and Company, 2005 (n = 574 stores)

		Interior and Exterior Tobacco Product Signs			
		Signs per Store: Special Price	**Signs per Store: Multi-pack Discount**	**Stores with at Least One Sign with a Promotion***	**Total Signage with a Promotion***
		mean (SD)	mean (SD)	%	%
Philip Morris	Marlboro	2.1 (3.6)	0.5 (1.7)	69.9%	46.6%
	Other PM	1.4 (2.9)	0.1 (1.0)	55.6%	45.3%
	All PM	**4.1 (7.5)**	**0.6 (2.8)**	**73.9%**	**46.8%**
R.J. Reynolds	Camel	0.5 (1.2)	0.4 (1.6)	32.4%	31.9%
	Other RJR	0.5 (1.3)	0.2 (1.1)	29.4%	42.8%
	All RJR	**1.3 (2.6)**	**0.6 (2.6)**	**35.2%**	**36.2%**
Lorillard	Newport	0.2 (0.7)	0.1 (0.5)	14.6%	17.8%
	Other Lorillard	0.0 (0.2)	0.0 (0.3)	1.7%	5.6%
	All Lorillard	**0.2 (0.8)**	**0.1 (0.6)**	**15.2%**	**14.9%**
Brown and Williamson	GPC	0.0 (0.0)	0.0 (0.0)	0.0%	0.0%
	Other B&W	0.5 (1.3)	0.2 (1.4)	28.7%	21.5%
	All B&W	**0.5 (1.3)**	**0.2 (1.4)**	**28.7%**	**20.4%**
Other Cigarette Companies		**0.1 (0.5)**	**0.0 (0.4)**	**8.2%**	**10.2%**
All Cigarette Companies		**6.3 (10.2)**	**1.6 (6.8)**	**79.4%**	**34.8%**

* Percent computed as all signs with promotions/all tobacco-related signs – across all stores.
Note: Free gift with purchase and all types of promotions on displays were too infrequent to warrant inclusion in table.

The data presented in Table 3 show a wide variation in the amount of marketing materials by store type, with supermarkets having an average of 51.5 marketing materials and gas-only stations averaging 14.4 marketing materials. If small tags displaying member benefit sales such as Safeway Club offers are removed from the data, the mean number of interior signs in supermarkets decreases from 49.1 to 15.7. Of all interior marketing materials, 57.8 percent are located within four feet of a counter. Supermarkets had the fewest materials located by the counter (28.1 percent) and convenience stores with gas had the most (69.5 percent). A little more than two-thirds (68.6 percent) of the stores had at least one marketing material located below three feet in height with almost all convenience stores (94.9 percent) falling into this category.

Image 1. Small tags displaying member benefit sales

Source: Stanford University Retailer Photo Web Site: http://prevention.stanford.edu/_studysites/store/index.htm

Table 3. Descriptive Statistics for Cigarette Marketing Materials by Store Type, 2005 (n = 574 stores)

Store Type	n	Shelving Units mean (SD)	Displays mean (SD)	Interior Signs mean (SD)	Exterior Signs mean (SD)	Interior and Exterior Functional Items mean (SD)	Total Marketing Materials mean (SD)	Interior Marketing Materials: Stores with at least one near counter	Interior Marketing Materials: Mean % of marketing near counter	Marketing Materials Below 3 Ft % with any
Convenience store with gas	150	1.6 (1.5)	0.5 (1.0)	15.9 (10.1)	5.3 (7.8)	0.1 (0.5)	23.5 (16.3)	92.3%	69.6%	66.0%
Convenience store without gas	39	1.4 (0.9)	0.3 (0.6)	22.5 (10.0)	5.7 (6.2)	0.1 (0.4)	30.0 (13.2)	94.9%	58.8%	94.9%
Drug store	51	1.7 (1.5)	0.2 (0.8)	17.5 (18.8)	0.4 (2.4)	0.0 (0.3)	19.8 (19.6)	90.2%	63.7%	72.5%
Gas only	27	0.4 (0.7)	0.3 (0.7)	4.5 (6.6)	9.2 (13.2)	0.0 (0.2)	14.4 (13.1)	48.2%	62.1%	29.6%
Liquor store	100	1.3 (1.3)	0.8 (1.6)	19.9 (15.6)	3.9 (4.5)	0.8 (1.4)	26.7 (20.1)	93.0%	56.6%	82.0%
Small market	144	1.0 (1.2)	0.7 (1.3)	11.7 (11.7)	2.0 (3.3)	0.6 (1.1)	16.0 (15.4)	76.4%	55.3%	56.9%
Supermarket	63	1.9 (1.6)	0.2 (0.6)	49.1 (74.7)	0.1 (0.5)	0.1 (0.3)	51.5 (75.0)	38.1%	28.1%	77.8%
Total	**574**	**1.4 (1.4)**	**0.5 (1.1)**	**19.2 (29.5)**	**3.4 (6.2)**	**0.3 (0.9)**	**24.9 (31.1)**	**80.7%**	**57.8%**	**68.6%**

Note: Removing small tags from analysis yields an average of 15.7 (SD = 19.7) interior signs per store within supermarkets, 10.2 (SD = 13.4) for drug stores, and 14.9 (SD = 13.7) overall.

Results: Smokeless tobacco marketing materials

Key findings for 2005:

- For 2005, about half the stores had smokeless tobacco marketing materials.
- These stores had an average of 7.7 marketing materials for smokeless tobacco products.
- There were more than twice as many marketing materials for Skoal than for Copenhagen.

Fewer than half (49 percent) of the stores in our survey had any marketing materials for smokeless tobacco. Of those that did, there was an average of 7.7 materials per store; most of these were in the form of branded signs posted inside the store. In the same stores, there were more than twice as many materials for Skoal as there were for Copenhagen. Supermarkets had more smokeless tobacco marketing materials than all other types of stores.

Table 4. Descriptive Statistics for Smokeless Tobacco Marketing Materials by Type of Material, 2005 (n=279)*

	Mean Number per Store		
Type of Marketing Material	n	mean	(SD)
Shelving units	279	0.1	(0.3)
Displays	279	1.4	(2.1)
Interior signs	279	5.9	(9.4)
Exterior signs	279	0.2	(0.7)
Functional items	279	0.1	(0.3)
Total Marketing Materials	**279**	**7.7**	**(10.0)**

* Includes only stores with at least one smokeless marketing material.

Table 5. Descriptive Statistics for Smokeless Tobacco Marketing Materials by Brand and Store Type, 2005 (n=279)*

	Stores with at Least One Smokeless Marketing Material (n=279)			
	Interior Signs		Total Marketing Materials**	
	n	mean (SD)	n	mean (SD)
Brand				
Copenhagen	279	1.1 (1.8)	279	1.4 (2.1)
Skoal	279	2.5 (4.1)	279	3.2 (4.2)
Other smokeless	279	2.3 (4.8)	279	3.1 (5.4)
Store Type				
Convenience store with gas	100	6.1 (8.2)	100	8.4 (9.4)
Convenience store without gas	27	7.9 (6.9)	27	8.8 (6.6)
Drug store	24	4.4 (3.7)	24	6.7 (3.4)
Gas only	1	0.0 (0.0)	1	2.0 (0.0)
Liquor store	55	3.9 (6.2)	55	5.4 (6.6)
Small market	45	4.9 (10.0)	45	6.4 (10.7)
Supermarket	27	10.7 (18.0)	27	12.6 (18.9)

* Includes only stores with at least one smokeless marketing material.
** Total marketing materials include interior and exterior signs, displays, shelving units, interior and exterior functional items.

Compliance with Four California Laws Regulating Tobacco Sales in Stores

Tobacco advertising, promotions, and marketing are largely unregulated in the retail environment. However, California restricts bidi sales and self-service displays of tobacco products to adult only venues (California Penal Code 308.1 and B&P Code Section 22962). Product displays provided by tobacco companies generally are imprinted with at least one prominent branded logo and usually are placed around counter areas. So, in addition to limiting access to tobacco products, this restriction may reduce the number of tobacco ads in stores. The California STAKE Act requires tobacco retailers to post STAKE Act age-of-sale warning signs around check out registers stating that tobacco sales are limited to those who are 18 and older (California B&P Code Section 22952[a]). Additionally, tobacco companies provide retailers with various age-of–sale signs such as “We Card.” California also requires retailers who sell tobacco to obtain licenses from the California BOE and to post them where customers can see them (B&P Code Section 22972, 22980.1).

Key findings for 2005:

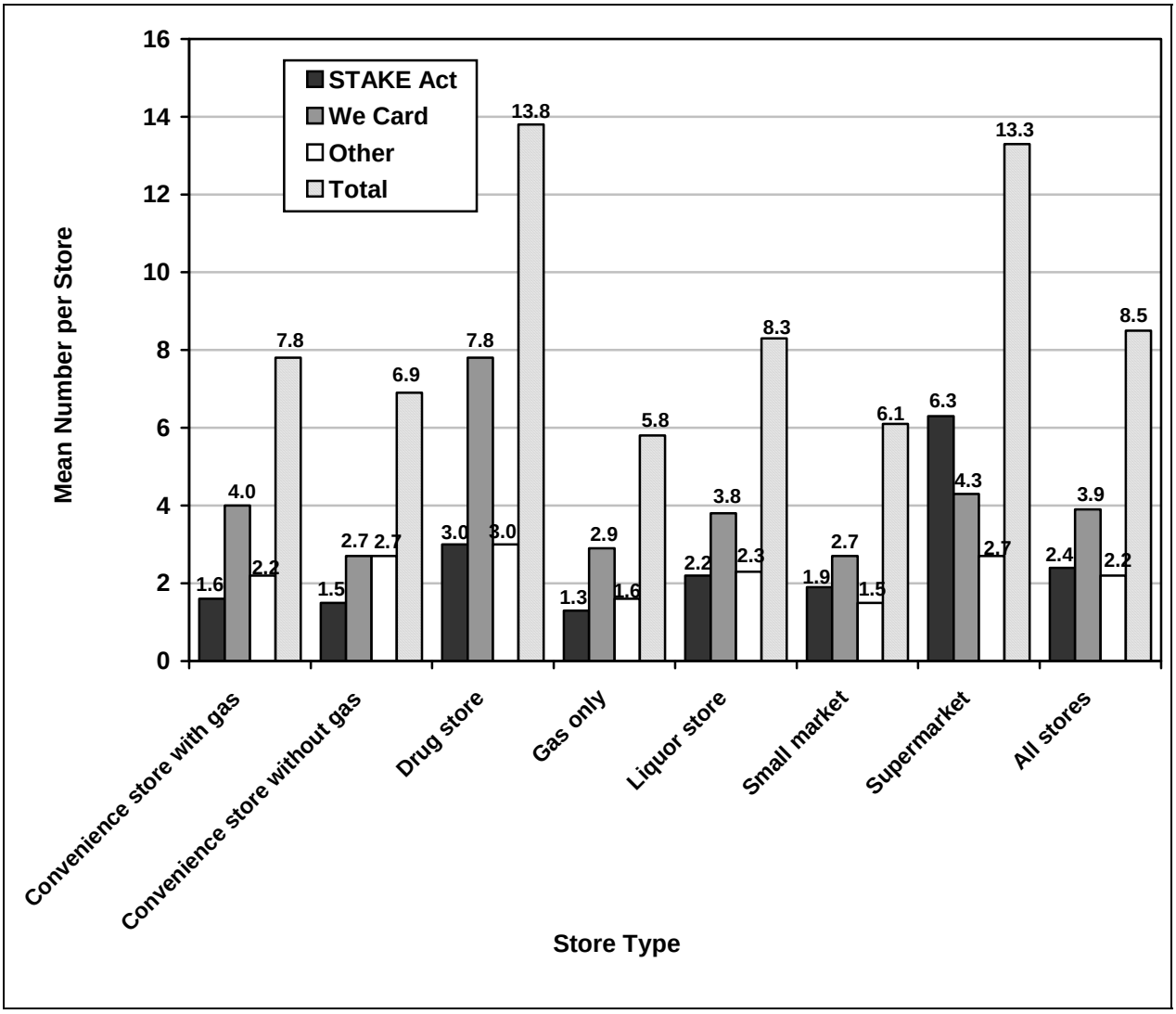
- All of the stores complied with the law that limits the sale of bidis to adult-only stores.
- Ninety percent of all stores complied with all provisions of the self-service display ban, meaning there were no self-service displays of cigarettes, smokeless tobacco, or cigars.
- Stores averaged 8.5 age-of-sale warning signs, of which 2.4 were STAKE Act signs.
- Only 71 percent of stores posted STAKE Act signs by a cash register.
- Slightly fewer than 60 percent of the stores posted State of California tobacco retail licenses in a visible location.

Figure 1 presents data on age-of-sale warning signs. On average, there were a total of 8.5 age-of-sale warning signs per store (interior and exterior). More age-of-sale warning signs were found in drug stores (13.8) and supermarkets (13.3) than in small markets and gas stations (6.0 and 6.1 respectively). Only supermarkets posted more STAKE Act signs (6.3) than "We Card" signs (4.3). Drug stores had more "We Card" signs (7.8) than other types of stores. More stores had at least one "We Card" sign (86.4 percent) than STAKE Act signage (80.7 percent).

Images 2 and 3. Examples of Age-of-Sale Warning Signs

Source: Stanford University Retailer Photo Web Site: http://prevention.stanford.edu/_studysites/store/index.htm

Figure 1. Mean Age-of-Sale Warning Signs by Store Type, 2005 (n=574)



In terms of compliance with state laws that regulate bidis, self-service displays (full compliance means no self-service for any tobacco products; cigarettes, smokeless, and cigars), licensing, and STAKE Act signage, Table 6 shows that none of the stores sold bidis and 90.4 percent of all stores were in compliance with the tobacco self-service display ban. However, there was variation by store type: 97.4 percent of convenience stores (without gas) complied but only 78.0 percent of liquor stores complied. Also, there were higher rates of compliance with the ban of self-service displays of cigarettes (98.3 percent) and smokeless tobacco products (97.4 percent) than of cigars (92.7 percent). Posting tobacco licenses in a visible location was observed in 58.8 percent of the stores. Only 70.7 percent of stores were in compliance with the requirement that STAKE Act signs must be posted by a cash register. Compliance varies considerably by store type: only 37.0 percent of gas-only stations were in compliance with STAKE Act signage requirements, compared to 79.5 percent of convenience stores (without gas). Tests for relationships between compliance with the

above state laws and the amount of marketing materials in stores failed to identify any significant relationships (p> 0.05). However, for each law, there was significant variation by store type (data not shown).

Table 6. Percent of Stores in Compliance by Store Type, 2005 (n = 574)

		No Self Service						
Store Type	n	Cigarettes	Smokeless	Cigars	Any Type (Cigarette, Smokeless, Or Cigar)	No Bidis for Sale	License Visible*	STAKE Act Signage Near Counter**
Convenience store with gas	150	99.3	97.3	91.3	90.0	100.0	64.7	71.3
Convenience store without gas	39	100.0	97.4	100.0	97.4	100.0	53.8	79.5
Drug store	51	96.0	98.0	98.0	94.1	100.0	43.1	54.9
Gas only	27	92.6	100.0	92.6	85.2	100.0	53.8	37.0
Liquor store	100	96.0	94.0	83.0	78.0	100.0	69.0	74.0
Small market	144	100.0	98.6	94.4	94.4	100.0	55.6	75.0
Supermarket	63	98.4	98.4	98.4	96.8	100.0	54.0	76.2
Total	**574**	**98.3**	**97.4**	**92.7**	**90.4**	**100.0**	**58.8**	**70.7**

* In accordance with the state law, only stores with licenses posted in places visible to shoppers were considered in compliance.

** In accordance with the STAKE Act, only stores with STAKE Act signage within four feet of the counter area were considered in compliance.

A Study of Prices of Three Premium and Three Discount Cigarette Brands

Price plays an important role in smoking rates. Numerous studies show that as cigarette prices increase, smoking prevalence decreases (Chaloupka, 1999, Lindblom, 2002), and that pricing influences purchase decisions (Hyland et al., 2005). Following the signing of the MSA, fairly steep cigarette price increases occurred through a combination of industry initiated increases and excise tax increases. There is some evidence that adult smokers are more price sensitive and less brand loyal than adolescents and are therefore willing to switch to cheaper brands. Cigarette companies produce both premium and discount brands in an effort to sell their products to a broad base of customers. In 2005, price information was collected to assess the amount of variability in the pricing of three top premium brands (Camel, Marlboro, and Newport) and three top discount brands (Basic, Doral, and GPC) in California stores. Studies of industry documents and interviews with retailers indicate that cigarette companies put their brands on sale and offer discounts to retailers in an effort to further reduce prices. As noted in the Introduction of this study, price discounts comprised the largest line item in cigarette company marketing expenditures as reported to the FTC. In return for price discounts from the companies, retailers usually are required to post advertising announcing the sales. This practice raises the question of whether the retail

environment is shaped by price. In other words, do stores selling cigarettes at lower prices have more marketing materials? For the purpose of these analyses, price without sales tax was used.

Research Questions

8. *How much variability is there in the pricing of three top premium and three top discount brands?*

9. *Is there a relationship between the amount of marketing materials and price in stores?*

Analysis

Variations in the price of a single pack of cigarettes overall by brand, and within each brand category (premium and discount) using repeated measures ANOVA models was examined. The price of a single pack of cigarettes was the outcome measure, which was measured up to six times per store (once for each brand). Each price model controlled for store type. The first model estimated price differences among the six brands. Price variation was examined by brand within each brand category, premium and discount. Thus the premium brand model examined price for Camel, Marlboro, and Newport.

Additional analysis of price data included generating descriptive statistics for the price of each of the six brands, split by store type, and computing Pearson correlation coefficients for price (six brands) and for categories of marketing materials (total marketing materials, displays, interior and exteriors signs, and signs promoting a special price). Further, within each brand, variation in price by existence of at least one sign promoting a special price was examined. The mean difference in the price per pack for stores with and without a special price was assessed using independent sample t-tests. A separate test was performed for each brand with sufficient data.

Results

Key findings for 2005:

- There was a $0.63 mean difference in price between premium and discount brands.
- The mean price of premium brands ranged from $4.03 to $4.37 per pack. There was less variability among discount brand prices, ranging from $3.52 to $3.57 per pack.
- Within stores there was significant variation in price among the three premium brands. Moreover, the amount of variation among the prices of premium brands differed by store type.
- The number of cigarette marketing materials increased as price decreased.

Table 7 depicts the mean differences in the prices of six cigarette brands. There was a $0.63 difference between premium and discount brands for which prices were obtained.

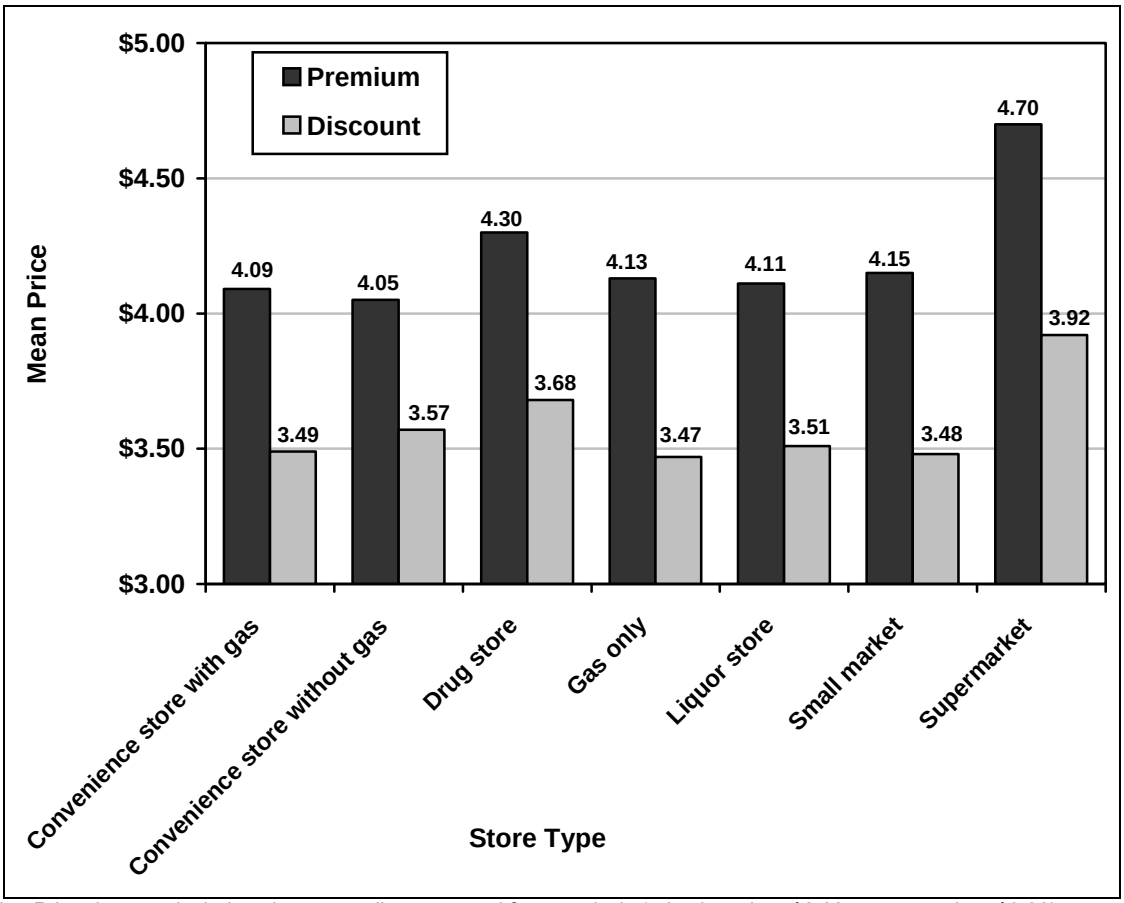
The mean price of premium brands ranged from $4.03 to $4.37 per pack. Discount brand prices varied little with only a $0.05 range between the highest and the lowest mean value. A repeated-measures analysis indicated that among the six brands studied, there was significant variability in price. Additionally, the detected brand differences differed significantly by store type (see Figure 2).

Table 7. Price* of a Single Pack of Cigarettes by Brand and Brand Category, 2005

Cigarette Brand	n**	mean	(SD)	min	max
Premium	550	4.19	(0.43)	3.05***	5.99***
Marlboro	530	4.03	(0.45)	2.79	7.98
Camel	494	4.23	(0.57)	2.99	5.99
Newport	461	4.37	(0.48)	3.15	5.99
Discount	489	3.56	(0.36)	2.77***	5.99***
Basic	442	3.57	(0.35)	2.72	5.99
Doral	280	3.53	(0.46)	2.49	5.99
GPC	346	3.52	(0.42)	2.31	5.99

* Price does not include sales tax; outliers removed from analysis (price less than $2.00 or greater than $9.00).
** n = the number of stores in which that brand was found.
*** Store is the unit of analysis, not pack.

Figure 2. Price* by Brand Category and Store Type, 2005



* Price does not include sales tax; outliers removed from analysis (price less than $2.00 or greater than $9.00).

Table 8. Repeated Measures ANOVA Models of Price Variation by Brand Category and Store Type, 2005

Premium Brands Model (Marlboro, Camel, Newport)

Effect	Value	F	Hypothesis df	Error df	p-value
Brand	0.730	79.108	2	427	0.000
Brand by Store Type	0.825	7.187	12	854	0.000

Discount Brands Model (Basic, Doral, GPC)

Effect	Value	F	Hypothesis df	Error df	p-value
Brand	0.991	0.939	2	196	0.393
Brand by Store Type	0.833	3.136	12	392	0.000

To further explore price variation, additional models were run to detect differences among premium brands and among discount brands controlling for store type. The price of a single pack of premium cigarettes significantly differed by brand and by store type. In contrast, discount brands did not show a statistically significant difference in mean price of a single pack among the three brands. However, there was a significant difference in the price of discount cigarettes by brand for some store types (see Table 8).

Figure 2 shows that supermarkets have the highest prices for the premium and discount brands studied. Convenience stores with gas and gas stations had the lowest prices for both types of brands. However, it should be noted that price differences among small markets, liquor stores, and convenience stores without gas were within a three-cent range for premium brands and a four-cent range for discount brands, indicating a highly competitive situation (see Appendix for price by store type for six brands individually).

Table 9 shows that for three brands–Camel, Newport, and Doral–there was a moderate negative correlation between price and marketing materials, which indicates that as the number of marketing materials increased, price decreased.

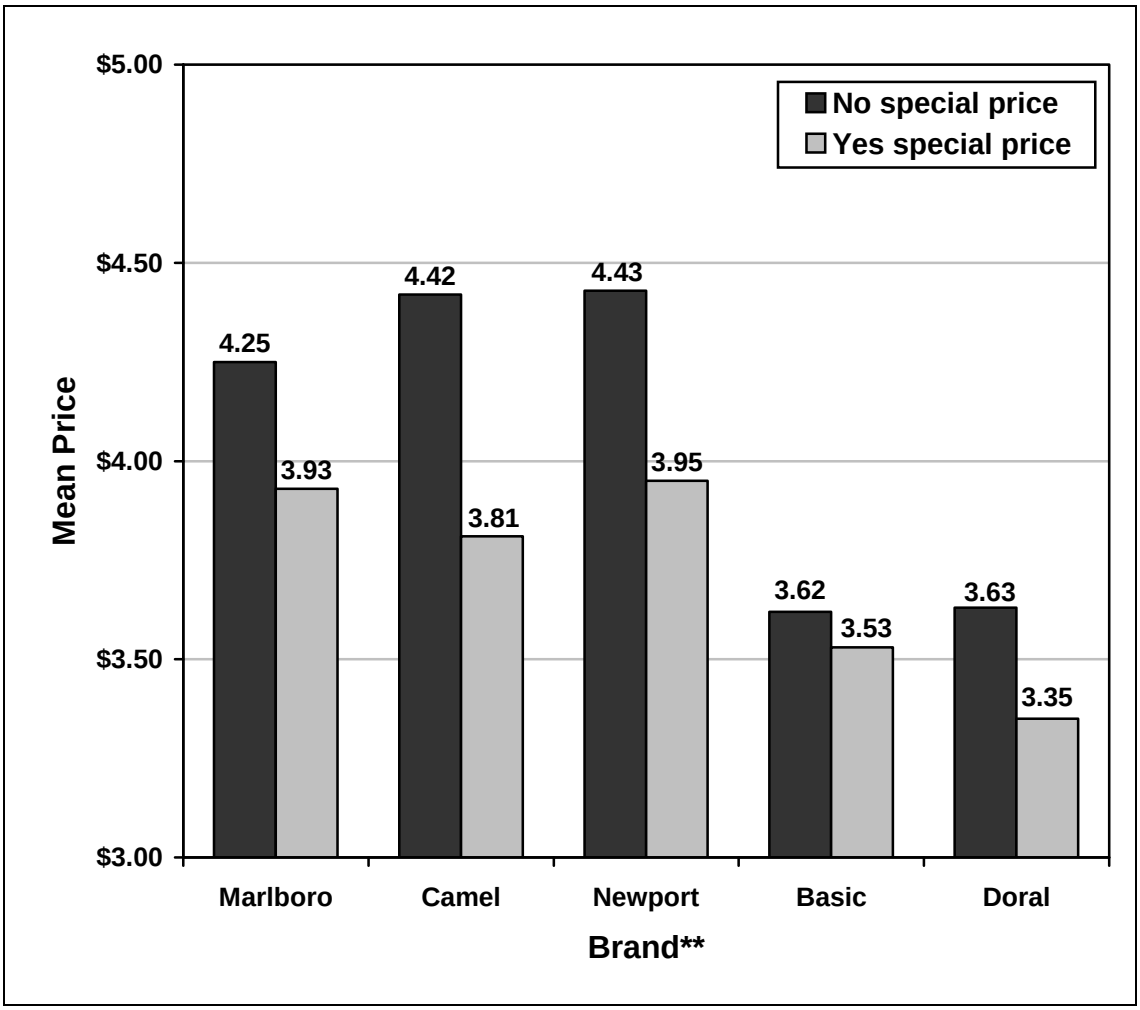
Table 9. Correlation Matrix For Price† and Select Marketing Materials, 2005

Cigarette Brand	Total Marketing Materials	Displays	Signs (Interior and Exterior)	Interior Signs with Special
Premium				
Marlboro	-0.056	-0.050	-0.031	-0.105*
Camel	-0.469**	-0.079	-0.470**	-0.199**
Newport	-0.436*	-0.119*	-0.450*	-0.225*
Discount				
Basic	0.083	-0.039	0.088	0.036
Doral	-0.332*	-0.055	-0.331*	-0.229*
GPC	0.084	0.008	0.072	n/a

* Correlation is significant at the 0.05 level (2-tailed).
** Correlation is significant at the 0.01 level (2-tailed).
† Price does not include sales tax; outliers removed from analysis (price less than $2.00 or greater than $9.00).
Note: No GPC signs with special price were observed.

The data shown in Figure 3 confirm that stores with at least one sign advertising a special price did indeed have significantly lower prices ($p < 0.01$). This was consistent for all five of the six brands for which a special price was advertised.

Figure 3. Price* in Stores With and Without at Least one Sign Advertising a Special Price by Brand, 2005 (n=574)



* Price does not include sales tax; outliers removed from analysis (price less than $2.00 or greater than $9.00).
** No GPC signs with special price were observed.

The Relationship Between Neighborhood Characteristics and the Retail Environment

Analyses of tobacco industry documents have shown that cigarette manufacturers have used advertising to target racial and ethnic minorities (Balbach, Gasior, and Barbeau, 2003; Muggli, Pollay, Lew, and Joseph, 2002) and children (Perry, 1999). The results of several studies confirm that cigarette advertising in stores has been used to target members of racial and ethnic groups, lower income consumers, and children. For instance, more in-store tobacco advertising has been documented in predominantly

ethnic and low-income neighborhoods (Laws, Whitman, Bowser, and Krech, 2002; Wildey, Young, Elder, Moor, Wolf, and Fiske, 1992). Most stores selling tobacco in school neighborhoods (92 percent) have some form of tobacco advertising (Terry-McElrath, Wakefield, Giovino, Hyland, Burker, Chaloupka et al., 2002), stores close to schools have more exterior tobacco advertising than stores that are further away (Pucci, Joseph, and Siegel,1998; Rogers, Feighery, Tencati, Butler, and Weiner, 1995), and stores where adolescents shop frequently have more marketing than other stores in the same community (Henriksen, Feighery, Schleicher, Haladjian, and Fortmann, 2004b). In a 1999 survey of a random sample of 586 tobacco retail outlets in California, 48 percent had ads at the eye level of small children and almost 25 percent had cigarette displays next to candy (Feighery, Ribisl, Schleicher, Lee, and Halvorson, 2001). In this study, the relationships between neighborhood characteristics and the retail environment were explored by using store observation data and census data variables, including population density, SES, ethnicity, and percent of population under 18 years of age. Proximity of individual stores to schools also was examined. For the purpose of these analyses, small tags (announcing club member discounts) were removed out of concern that they misrepresent the supermarket environment with regard to tobacco advertising.

Research Question

10. *Does the amount and placement of tobacco advertising and promotional materials vary by census characteristics (e.g., SES, ethnicity, population density, percent youth under 18 years of age) and proximity to schools?*

Analysis

To assess the relationship between neighborhood characteristics and the retail environment, variability in the total number of cigarette marketing materials and proportion of these materials with a promotion (special price or multi-pack discount) by eight neighborhood characteristics was examined. Analysis of the proportion of marketing materials with a promotion was limited to stores with at least one cigarette marketing material. For these analyses, a neighborhood was defined as the census tract in which the store was located. The location of each store in the 2005 cross-sectional sample was geocoded, and corresponding census tract data and other neighborhood data extracted for each store by a group specializing in GIS. There was very little clustering of stores within census tracts for the 574 stores included in the 2005 cross-sectional analysis sample. The 574 stores were located within 538 census tracts. Of these 538 tracts, 93.7 percent had only one store per tract. Thus, clustering was too infrequent to warrant a multi-level approach to the analysis of neighborhood characteristics. To address the minimal clustering observed, one store was randomly selected from each tract with more than one store, resulting in the removal of 36 stores from the analysis sample (or 6.3 percent of the 574 stores). This yielded an analysis sample of 538 stores.

Seven of the eight neighborhood characteristic variables of interest were based on census tract data: quartile of population density, quartile of proportion of population under 18 years of age, above average proportion of four ethnicity groups (African Americans, Asian/Pacific Islanders, Hispanics, and non-Hispanic whites), and a composite measure of SES. The ethnicity variables were dichotomous measures indicating whether the proportion of a particular group within a census tract was greater than the statewide proportion of that group. For example, the above average proportion indicated whether the proportion of African Americans in the census tract was above the statewide proportion of African Americans (seven percent). The SES variable was a composite measure created using principal component analysis (see Methods section for further detail). The final neighborhood characteristic variable was proximity to the nearest school in miles. School was defined as a public school (traditional or non-traditional) serving any kindergarten through 12th grade students.

To examine bivariate relationships, descriptive statistics were generated for each of the two response variables (total cigarette marketing materials and proportion of cigarette marketing materials with a promotion), split by values for the predictor variables. For the purpose of the bivariate analysis, SES was collapsed into three categories: lowest score to -1, greater than -1 to less than +1, and +1 to highest value. Miles to nearest school was also collapsed into three categories: closest distance to one-quarter mile, greater than one-quarter mile to less than one mile, and one mile or farther. In addition to the neighborhood characteristics, variation by store type was also examined.

To model relationships, the total number of marketing materials and proportion of materials with a promotion were regressed onto the seven census characteristics (e.g., population density, SES, ethnicity, percent youth under 18 years of age) and proximity to schools, while controlling for store type. In each regression model, quartiled variables were entered with “Quartile 1” as the reference group. Convenience stores with gas served as the reference group for store type, as this was the most prevalent store type within the analysis sample. Of stores included in the regression models, none had missing data.

Results

Key findings for 2005:

- Stores in the most densely populated areas contained fewer cigarette marketing materials.
- Stores located in neighborhoods with a greater proportion of African Americans than the statewide proportion contained more marketing materials even after controlling for store type. Similar relationships were not found in neighborhoods with greater proportions of Asian/Pacific Islanders, Hispanics or non-Hispanic whites.
- There were no statistically significant relationships between the amount of marketing materials and neighborhood SES or distance to the nearest school.
- Analyses failed to identify statistically significant relationships between neighborhood characteristics and the proportion of marketing materials with a promotion.

Table 10 describes the amount of marketing materials and the proportion of those materials announcing promotions, such as a reduced price split by neighborhood characteristics and store type. These data indicate that stores located in more densely populated neighborhoods contained fewer marketing materials than stores in less densely populated neighborhoods, and a smaller portion of the marketing materials announced promotions. Stores in neighborhoods with the highest percentage of children contained fewer marketing materials. Stores in neighborhoods with an above-average proportion of African Americans contained more tobacco marketing materials than other neighborhoods, but no difference was observed regarding materials with promotions. No variation in the amount of marketing materials was observed with regard to neighborhood SES or proximity to schools.

Table 10. Descriptive Statistics for Cigarette Marketing Materials* by Neighborhood Characteristics, 2005 (n=538**)

	Total Marketing Materials (n = 538)		Proportion of Total Marketing Materials with a Promotion (n = 506, stores with at least one marketing material)	
	n	mean (SD)	n	mean (SD)
Population Density Quartile				
1	134	23.2 (19.1)	129	0.290 (0.225)
2	135	21.4 (17.8)	131	0.302 (0.225)
3	135	21.5 (19.1)	123	0.323 (0.220)
4	134	15.8 (13.5)	123	0.241 (0.209)
Proportion of African Americans				
Equal to or below California rate	404	18.9 (17.1)	379	0.289 (0.224)
Above California rate	134	25.1 (18.7)	127	0.291 (0.213)
Proportion of Asians/Pacific Islanders				
Equal to or below California rate	396	21.1 (17.7)	379	0.288 (0.221)
Above California rate	142	18.6 (17.6)	127	0.295 (0.224)
Proportion of Hispanics				
Equal to or below California rate	325	21.9 (19.1)	308	0.296 (0.226)
Above California rate	213	18.4 (15.2)	198	0.280 (0.214)
Proportion of non-Hispanic Whites				
Equal to or below California rate	255	18.8 (16.2)	237	0.274 (0.216)
Above California rate	283	22.0 (18.8)	269	0.303 (0.225)
Proportion of Population Under 18 Yrs Old Quartiles				
1	137	20.4 (18.6)	129	0.291 (0.206)
2	132	21.9 (18.8)	121	0.304 (0.217)
3	135	22.0 (17.6)	129	0.279 (0.219)
4	134	17.6 (15.5)	127	0.283 (0.242)
Socio-economic Status				
Lowest to -1	78	19.9 (19.9)	71	0.283 (0.217)
0 (> -1 to < +1)	373	21.5 (17.9)	352	0.298 (0.218)
+1 to highest	87	16.8 (13.9)	83	0.255 (0.234)
Miles to Nearest School				
Lowest 0.25 miles	140	17.4 (14.6)	131	0.284 (0.228)
> 0.25 to < 1.0 miles	364	22.0 (18.7)	342	0.294 (0.213)
1 mile or greater	34	16.9 (16.0)	33	0.258 (0.272)
Store Type				
Convenience store with gas	140	23.2 (16.1)	136	0.374 (0.203)
Convenience store without gas	36	30.4 (13.7)	35	0.276 (0.118)
Drug store	49	12.8 (15.1)	47	0.186 (0.237)
Gas only	26	14.9 (13.2)	24	0.402 (0.285)
Liquor store	93	26.6 (20.7)	93	0.293 (0.183)
Small market	134	16.1 (15.7)	118	0.239 (0.236)
Supermarket	60	17.3 (20.0)	53	0.225 (0.205)

* Marketing materials include interior signs (excluding small signs), exterior signs, shelving units, displays, interior and exterior functional items.

** To remove clustering effects, one randomly selected store from tracts with multiple stores was retained for analysis (36 stores removed from analysis).

Table 11 displays results of regression models in which variation in marketing materials and promotional materials by neighborhood characteristics controlling for store type was assessed. As with the bivariate analysis, stores located in the most densely populated census tract had 8.5 fewer marketing materials compared to stores in the least densely populated tracts. However, stores in neighborhoods with an above-average proportion of African Americans had 9.6 more marketing materials on average compared to stores in neighborhoods with average or below average proportions of African Americans. No significant relationships were found between the amount of marketing materials by proportion of minors, SES, or distance to the nearest school. For the model with the response variable proportion of materials advertising a promotion, there was significant variation by store type, but none of the neighborhood characteristic predictors was statistically significantly related to proportion of materials advertising promotions.

Table 11. Regression Models for Total Marketing Materials* and Proportion of Materials with a Promotion Predicted by Neighborhood Characteristics, Controlling for Store Type, 2005 (n=538**)

	Total Marketing Materials (n=538)		**Proportion of Total Marketing Materials with a Promotion (n=506, stores with at least one marketing material)**	
Predictor	coefficient	p-value	coefficient	p-value
Constant	24.2	0.000	0.328	0.000
Population Density Quartile				
1	Reference		Reference	
2	-2.3	0.270	0.006	0.841
3	-3.5	0.117	0.019	0.520
4	-8.5	0.001	-0.035	0.275
Proportion of African Americans				
Equal to or below California rate	Reference		Reference	
Above California rate	9.6	0.000	0.029	0.235
Proportion of Asians/Pacific Islanders				
Equal to or below California rate	Reference		Reference	
Above California rate	-1.2	0.533	0.023	0.363
Proportion of Hispanics				
Equal to or below California rate	Reference		Reference	
Above California rate	-1.4	0.557	0.021	0.520
Proportion of non-Hispanic Whites				
Equal to or below California rate	Reference		Reference	
Above California rate	1.1	0.661	0.032	0.327
Proportion of Population Under 18 Years Old Quartile				
1	Reference		Reference	
2	0.5	0.795	0.005	0.849
3	1.5	0.492	-0.008	0.787
4	-1.7	0.529	0.027	0.441
Socio-economic Status	-0.3	0.809	-0.014	0.352
Miles to Nearest School	-0.6	0.379	0.002	0.827
Store Type				
Convenience store with gas	Reference		Reference	
Convenience store without gas	7.9	0.011	-0.095	0.020
Gas station	-8.3	0.019	0.021	0.654
Drug store	-11.3	0.000	-0.193	0.000
Liquor store	4.8	0.032	-0.078	0.008
Small Market	-4.9	0.017	-0.123	0.000
Supermarket	-6.0	0.018	-0.146	0.000

* Marketing materials include interior signs (excluding small signs), exterior signs, shelving units, displays, and interior and exterior functional items.

** To remove clustering effects, one randomly selected store from tracts with multiple stores was retained for analysis (36 stores removed from analysis).

Longitudinal Results from 2000-2005

Since the implementation of the MSA, cigarette companies have increased their overall marketing expenditures and also have allocated a larger share of those expenditures to the retail outlet (Pierce and Gilpin, 2004). Increases in the amount of cigarette advertising have also been documented on storefronts (Celebucki and Diskin, 2002) and overall at retail outlets (Wakefield et al., 2002). As was noted in the Introduction, the retail environment continues to consume a vast portion of cigarette companies' marketing dollars. The annual marketing expenditure reports are usually released by FTC about 18 months after the close of the reporting period, so the latest report addresses year 2003 expenditures. This report's longitudinal analyses begin with data from 2000. From 2000 to 2003 there was a 58 percent increase in marketing expenditures, from $9.6 billion in 2000 to $15.1 billion in 2003. The proportion of expenditures in stores also increased from 80.4 percent ($7.7 billion) to 85.2 percent ($12.9 billion). The purposes of this section are to assess trends over time in the amount and type of cigarette advertising from 2000-2005, and study the correlates of change over this period of time.

Research Questions

11. *How have the amounts and placement of tobacco changed over time? This analysis includes examination of correlates of change (neighborhood characteristics and store type).*

12. *How have promotional strategies by brand and company changed over time?*

Analysis

Using longitudinal store observation data from 2000-2005, trends in the amount and type of tobacco advertising over time were examined. First, descriptive statistics were generated for amount and type of marketing materials and promotions over the study period, 2000-2005. Next, whether changes over time systematically varied across stores and neighborhoods was assessed. When systematic variation existed, models were estimated to identify and quantify correlates of change based on store type and neighborhood characteristics.

To model growth rates and correlates of change, the data were conceptualized as forming a hierarchy where data at each time point was nested within individual stores. Multi-level models, also referred to as individual growth curve models, were estimated. In essence, this technique estimates individual growth curves for each store included in the analysis. Multi-level models can accommodate unbalanced panel data sets, unlike traditional repeated measures ANOVA models. Thus, stores without data for all five time points were included in the longitudinal analysis. All stores with data for at least one time point from 2000-2005 were retained in the analysis. As with the cross-sectional neighborhood characteristic analysis, in tracts with two or more stores, one store was randomly selected to be retained for analysis. After removing stores

clustered within census tracts, the analysis sample size was 671 stores (See the Appendix for tables summarizing longitudinal data availability).

The multi-level models consisted of two levels: level one was the repeated measures of response variables within stores over time, and level two involved store characteristics. Level one variables were time variant, meaning their values within individual stores could change at each time point. Level one variables included response variables and time point, or year of data collection. Level two variables were time invariant, meaning values for these variables were constant across all time points. Level two variables included store type and neighborhood characteristics. Because of the limited amount of clustering of stores within census tracts, neighborhood characteristics also were level two variables.

Separate models were estimated for two response variables: the total number of marketing materials, and the total number of displays per store. The sole level one predictor was time point. Level two predictors included store type and neighborhood characteristics. Although for some stores the store type classification changed over time, owing to protocol improvements, the classification made in the last year of available data was used in the models. Prior to entry into models, store type was dummy coded, and small market served as the reference group, because out of the 671 stores this was the most prevalent store type. Neighborhood characteristics included in the multi-level model were population density (quartiles), proportion of population under 18 years old (quartiles), high proportion of African Americans, Asians/Pacific Islanders, Hispanics, and non-Hispanic whites, and a standardized measure of SES.

Fitting the multi-level models was an iterative process. Preliminary models tested for variation in the level one intercept and slope across stores, meaning the models assessed whether the mean of the response variable in 2000 (the level one intercept) and the growth rate or annual change in response variable (level one regression coefficient for time or slope) systematically varied across stores. After confirming the significant variation in growth rate, level two predictors were added to identify correlates of change. We did not attempt to model variation in initial values (response values in 2000 or the level one intercept), as the goal of these analyses was to model growth rate, not variation specific to initial values. Model parsimony was compromised in part by store type being dummied and thus yielding six control variables at level two. In an effort to improve model parsimony, predictors of growth rate with p-values greater than 0.10 for both outcomes were removed from final models. For store type, if one store was statistically significant, all six store type indicator variables were retained.

Growth was modeled as a linear function due to sparse data. The combination of data from a maximum of five time points and an unbalanced data set restricted the ability to examine curvilinear growth rates (See the Appendix for further model specifications).

Results

Longitudinal Key findings from 2000-2005:

- The amount of cigarette marketing materials increased from an average of 19.1 materials in 2000 to an average of 24.9 materials in 2005. Significant increases occurred in supermarkets, convenience stores without gas, and liquor stores.
- From 2002-2005, the percent of stores with at least one ad for a sales promotion increased from 68.4 percent to 79.4 percent.
- Between 2003 and 2005, the percentage of stores that placed the required STAKE Act signage in close proximity to the counter area increased from 56.7 percent to 70.7 percent.
- Since 2000, the amount of cigarette displays has steadily decreased from a mean of 1.9 displays in 2000 to a mean of 0.5 in 2005.
- The amount of cigarette marketing materials in stores located in low SES neighborhoods increased significantly; this was also true for stores located in neighborhoods with a higher proportion of African Americans than the statewide average.
- The annual rate of decrease in the number of displays was significantly faster in supermarkets, gas stations, and drug stores than in small markets. After controlling for store type, the rate of decrease in the number of displays was significantly slower in stores located in neighborhoods with lower SES.

Trends Over Time

Descriptive statistics for marketing materials and promotions from 2000-2005 are presented in Table 12. Overall, the total amount of marketing materials per store increased significantly from 2000-2005 (19.1 to 24.9). The trend data also show an overall significant increase from 2002-2005 in the percent of stores with at least one ad for a sales promotion (from 68.4 percent to 79.4 percent of stores). Percent of stores with items placed below three feet in height decreased significantly from 2002-2005.

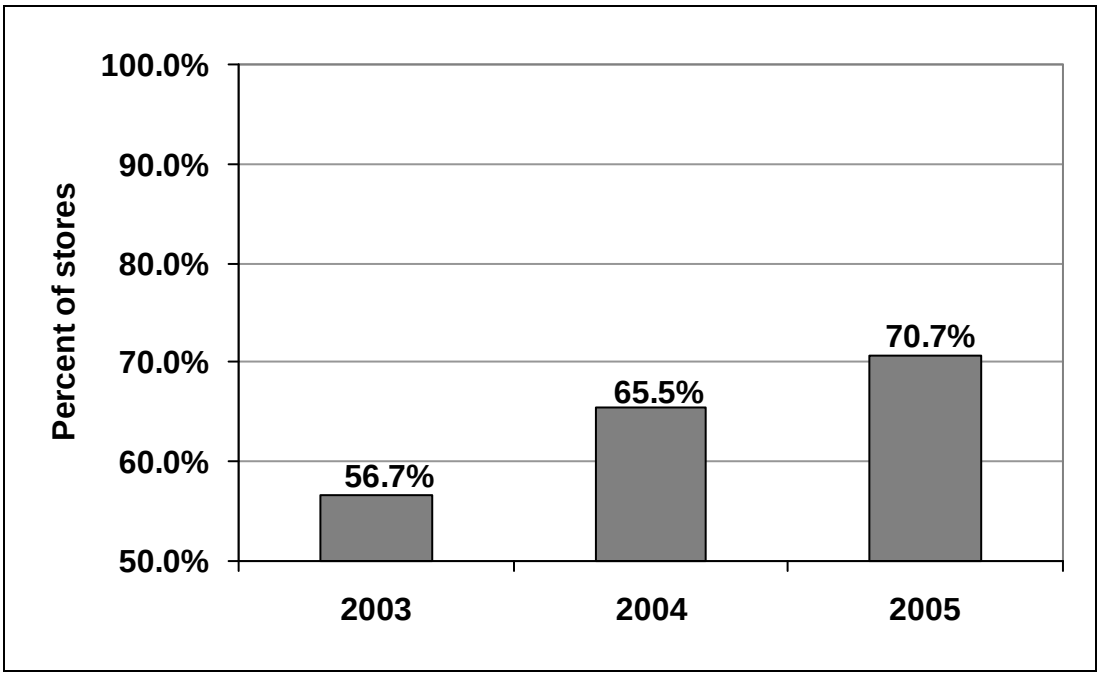
Table 12. Descriptive Statistics for Amount and Type of Cigarette Marketing Materials* and Promotional** Items Over Time (2000-2005)

	2000 (n = 562 stores)	2002 (n = 569 stores)	2003 (n = 554 stores)	2004 (n = 565 stores)	2005 (n = 574 stores)
	mean (SD)	mean (SD)	mean (SD)	Mean (SD)	mean (SD)
Type of Marketing Material					
Shelving units	N/A	1.4 (1.5)	2.9 (3.5)	1.6 (1.9)	1.4 (1.4)
Displays	1.9 (3.1)	1.4 (2.3)	1.1 (2.1)	0.9 (1.8)	0.5 (1.1)
Interior signs	N/A	16.7 (22.8)	16.1 (19.3)	19.4 (22.6)	19.2 (29.5)
Exterior signs	3.3 (4.8)	2.8 (5.0)	3.3 (5.9)	3.7 (6.7)	3.4 (6.2)
Interior and exterior Functional items	2.2 (2.8)	0.5 (1.2)	0.4 (0.9)	0.4 (1.0)	0.3 (0.9)
Total marketing Materials	19.1 (18.6)	22.7 (25.2)	22.4 (22.7)	26.1 (25.2)	24.9 (31.1)
Total Marketing Materials by Company					
Philip Morris	7.4 (8.1)	9.4 (13.6)	8.4 (11.9)	11.6 (15.0)	11.4 (16.7)
R.J. Reynolds	5.4 (9.6)	7.3 (11.8)	6.7 (10.3)	6.1 (8.9)	5.8 (8.1)
Lorillard	1.5 (3.3)	2.0 (4.6)	2.0 (4.1)	2.0 (4.1)	2.5 (4.6)
Brown & Williamson	4.3 (8.4)	3.7 (5.9)	4.0 (5.6)	4.9 (6.7)	3.6 (7.0)
Other company	0.5 (1.3)	0.9 (2.1)	1.3 (2.5)	1.4 (2.6)	1.6 (2.9)
Total	19.0 (18.8)	22.7 (25.2)	22.4 (22.7)	26.1 (25.2)	24.9 (31.1)
Stores with at Least One					
Promotional item	N/A	68.4%	76.7%	74.3%	79.4%
Item below three feet	N/A	78.6%	76.7%	77.9%	68.6%
Item near candy	N/A	12.5%	18.8%	12.9%	9.6%

* Marketing materials include interior signs, exterior signs, shelving units, displays, and interior and exterior functional items.
** Promotional items include special price or multi-pack discount.
N/A = Equivalent data not available.

Data regarding store compliance with posting a STAKE Act sign near a cash register has been available since 2003. Prior to 2003, data for interior STAKE Act signage was not specific regarding proximity to a cash register. As presented in Figure 4, the percentage of stores in compliance with STAKE Act signage laws has increased significantly from 56.7 percent in 2003 to 70.7 percent in 2005.

Figure 4. Percent of Stores With at Least one STAKE Act Sign Near Counter, 2003-2005



Multi-level Models

Tables 13 and 14 and Figure 5 present descriptive statistics for total cigarette marketing materials and displays by store type from 2000-2005 for those stores included in the multi-level analysis. The data suggests that the amount of materials actually decreased in two store types (small markets and liquor stores) and that, conversely, there was more than a four-fold increase in cigarette marketing materials in supermarkets and a two-fold increase in such materials in chain convenience stores with gas. Since 2000, cigarette displays have steadily decreased from a mean of 1.9 per store displays in 2000 to a mean of 0.5 displays per store in 2005.

Table 13. Descriptive Statistics for Marketing Materials* by Year (2000-2005) and Store Type (n=671**)

	2000		2002		2003		2004		2005	
Store Type	n	mean (SD)	n	mean (SD)	n	mean (SD)	n	mean (SD)	n	mean (SD)
Convenience store with gas	123	18.4 (17.9)	125	19.3 (16.7)	134	19.2 (15.5)	135	23.6 (17.1)	136	23.4 (16.1)
Convenience store without gas	37	15.6 (10.1)	37	28.1 (19.8)	35	29.2 (14.6)	35	33.5 (12.9)	37	30.3 (13.5)
Drug store	41	11.9 (13.9)	47	20.3 (18.3)	48	21.0 (24.5)	49	22.3 (20.6)	48	20.0 (20.2)
Gas only	24	9.8 (7.7)	30	14.5 (15.2)	26	14.0 (11.6)	26	18.7 (17.2)	28	14.4 (13.0)
Liquor store	91	29.7 (24.7)	95	29.2 (22.0)	89	29.7 (22.6)	94	31.9 (21.9)	93	27.2 (20.4)
Small market	140	20.4 (19.2)	144	17.3 (18.9)	133	18.9 (20.8)	132	18.0 (21.6)	133	15.9 (15.2)
Supermarket	61	12.2 (13.8)	60	39.3 (51.3)	61	26.7 (36.7)	62	42.4 (45.3)	61	48.9 (71.5)
Total	**517**	**19.1 (19.1)**	**538**	**23.2 (25.6)**	**526**	**22.3 (22.5)**	**533**	**26.1 (25.2)**	**536**	**24.8 (30.4)**

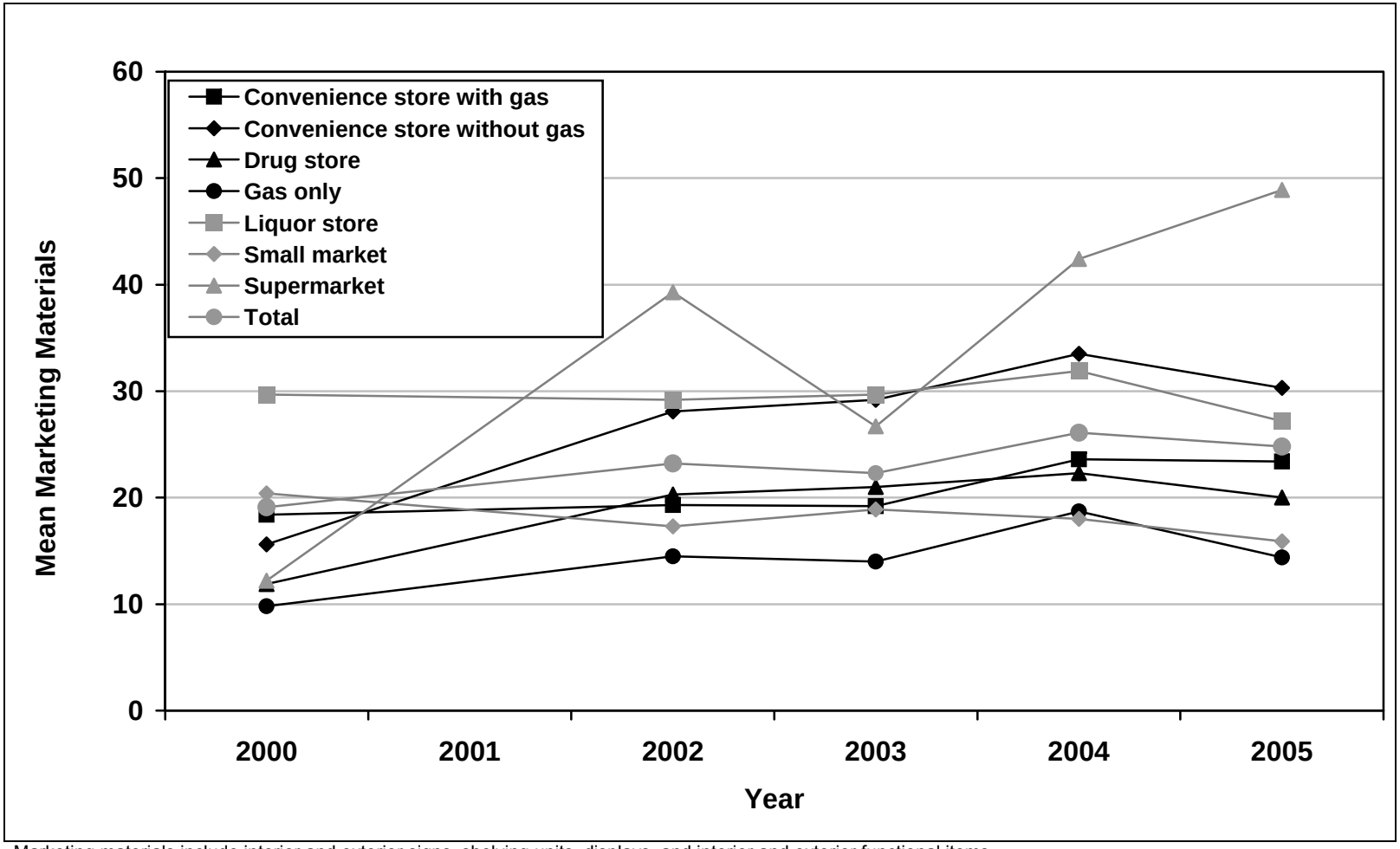
* Marketing materials include interior and exterior signs, shelving units, displays, and interior and exterior functional items.
** Sample size refers to number of stores with valid data for at least one time point (for census tracts with more than one store, store with data for most time points retained, if multiple stores with same number of time points - one randomly selected).

Table 14. Descriptive Statistics for Displays by Year (2000-2005) and Store Type (n=671*)

	2000		2002		2003		2004		2005	
Store Type	n	mean (SD)	n	mean (SD)	n	mean (SD)	n	mean (SD)	n	mean (SD)
Convenience store with gas	123	1.8 (2.4)	125	1.4 (2.1)	134	1.0 (1.8)	135	0.9 (1.6)	136	0.5 (1.0)
Convenience store without gas	37	1.4 (2.4)	37	1.1 (1.6)	35	1.0 (1.6)	35	1.2 (2.4)	37	0.4 (0.6)
Drug store	41	4.9 (5.3)	47	0.6 (1.5)	48	0.3 (0.7)	49	0.3 (1.0)	48	0.3 (0.8)
Gas only	24	0.9 (1.8)	30	0.5 (0.8)	26	0.7 (1.0)	26	0.4 (0.8)	28	0.3 (0.7)
Liquor store	91	2.2 (3.0)	95	2.4 (2.9)	89	2.3 (3.0)	94	1.7 (2.5)	93	0.9 (1.7)
Small market	140	1.6 (2.4)	144	1.7 (2.6)	133	1.3 (2.2)	132	1.0 (1.7)	133	0.7 (1.3)
Supermarket	61	0.7 (2.8)	60	0.2 (0.9)	61	0.2 (0.7)	62	0.2 (1.1)	61	0.2 (0.6)
Total	**517**	**1.9 (3.0)**	**538**	**1.4 (2.3)**	**526**	**1.1 (2.1)**	**533**	**0.9 (1.8)**	**536**	**0.5 (1.1)**

* Sample size refers to number of stores with valid data for at least one time point (for census tracts with more than one store, store with data for most time points retained, if multiple stores with same number of time points - one randomly selected).

Figure 5. Mean Number of Marketing Materials* by Year and Store Type (n=671**)



* Marketing materials include interior and exterior signs, shelving units, displays, and interior and exterior functional items.

** Sample size refers to number of stores with valid data for at least one time point (for census tracts with more than one store, store with data for most time points retained, if multiple stores with same number of time points - one randomly selected).

Summary of Multi-level Models for Total Number of Cigarette Marketing Materials

In the initial multi-level model with number of cigarette marketing materials as the response variable, and time as the sole level one predictor, the estimated mean growth rate was 1.2 ($p < 0.0001$). This means on average, the total number of cigarette marketing materials increased by 1.2 items per year. The model estimated statistically significant non-zero variance of individual growth rates (variance component estimate 17.3, $p < 0.0001$). Thus, based on model estimates, the growth rate varied significantly across stores.

Level two predictors of the growth rate were added to subsequent models, and the final model included the following predictors of growth: store type, population density, proportion of population under 18 years of age, SES, and a high proportion of African Americans, Hispanics, and non-Hispanic whites (see Table 15). In the final model, the level two intercept for growth rate represented small markets in neighborhoods of average SES, low to moderate population density, proportion of population under 18 years not within the second lowest quartile of the youth population, and without a high proportion of African Americans, Hispanics, or non-Hispanic whites. In the final model, there was not a statistically significant growth rate for the reference category, meaning the model estimated no significant change in the number of marketing materials over the study period for small markets in neighborhoods that were not densely populated, had average SES, not within quartile 2 of proportion of youth, and did not have a high proportion of African Americans, Hispanics, or non-Hispanic whites. However, the model did estimate significant annual increases in the number of marketing materials for three store types; supermarkets, convenience stores without gas, and liquor stores. Supermarkets had the greatest estimated growth rate, 5.7 items per year ($p <0.0001$). For convenience stores without gas, the estimated annual increase was 3.1 items, and for liquor stores it was 1.9 items ($p <0.0001$ for both store types). The number of marketing materials decreased 1.3 items annually for stores in communities with the highest population density ($p = 0.001$). Finally, stores in neighborhoods with an above average proportion of African Americans had the number of marketing materials increase by an estimated 2.5 items per year ($p < 0.0001$).

The final model accounted for 24.3 percent of the total variation in variation in growth rates across stores.

Table 15. Longitudinal Multi-level Model for Total Number of Cigarette Marketing Materials per Store Predicted by Time and Neighborhood Characteristics, Controlling for Store Type

Level 2 - Fixed Effects				
	Coefficient	Robust Standard Error	t-ratio	p-value
For Intercept				
Intercept	19.51	0.81	24.07	0.000
For Slope (growth rate)				
Intercept	-1.20	0.34	-1.88	0.060
Convenience store with gas	0.70	0.41	1.69	0.091
Convenience store without gas	3.10	0.54	5.73	0.000
Drug store	0.49	0.54	0.90	0.368
Gas only	-0.60	0.60	-1.00	0.320
Liquor store	1.86	0.48	3.85	0.000
Supermarket	5.65	1.32	4.29	0.000
Population Density Quartile 4	-1.34	0.40	-3.39	0.001
Proportion of population under 18 Quartile 2	0.70	0.54	1.29	0.197
SES**	-0.17	0.24	-0.70	0.482
High proportion of African Americans	2.55	0.50	5.10	0.000
High proportion of Hispanics	0.14	0.53	0.26	0.797
High proportion of non-Hispanic Whites	0.95	0.61	1.55	0.122

Variance Components - Random Effects					
		Standard Deviation	Variance Component	Chi-square	p-value
Intercept	μ_0	11.96	143.02	900.20	0.000
Slope – Year	μ_1	3.62	13.11	886.48	0.000
Level 1	R	17.14	293.77		

* Marketing materials include interior and exterior signs, shelving units, displays, and interior and exterior functional items.
** SES is a composite measure of socio-economic standing; higher scores equal higher socio-economic standing.

Summary of Multi-level Models for Total Number of Cigarette Displays

In the initial multi-level model with the number of displays as the response variable and time as the sole level one predictor, the estimated mean growth rate was -0.3 ($p < 0.0001$). This means that on average, there was an estimated annual decrease of 0.3 cigarette displays per store. The model estimated statistically significant non-zero variance of individual growth rates (variance component estimate 0.18, $p < 0.0001$). Thus, based on model estimates, the annual rate of change varied significantly across stores.

Level two predictors of growth rate were added to subsequent models, and the final model included the following predictors of growth: store type, population density, SES, proportion of population under 18 years of age, and a high proportion of African Americans, Hispanics, and non-Hispanic whites (see Table 16). In the final model, the level two intercept for growth rate represented small markets in neighborhoods of average SES, low to moderate population density, not in quartile 2 of proportion of population under 18 years, and without a high proportion of African Americans, Hispanics, and non-Hispanic whites. In the final model, the estimated annual rate of change was -0.2 ($p < 0.0001$), meaning the model estimated an annual decrease of 0.2 displays for small markets in neighborhoods that were not densely populated, had average SES, not in quartile 2 of proportion of youth, and did not have a high proportion of African Americans, Hispanics, and non-Hispanic whites. Compared to small markets, the rate of decrease did not vary for convenience stores with or without gasoline. However, for supermarkets, gas stations, and drug stores the annual rate of decrease was significantly greater than for small markets. Specifically, the estimated annual change in number of displays for supermarkets was -0.4 ($p < 0.0001$), for gas stations was -0.3 ($p = 0.001$), and for drug stores was -0.5 ($p < 0.0001$). The rate of decrease for liquor stores was not as fast as for small markets. The annual estimated change for liquor stores was -0.1 ($p = 0.023$). Controlling for store type, the rate of decrease was significantly slower in stores located in neighborhoods of lower SES.

The final model accounted for 4.3 percent of the total variation in growth rates across stores.

Table 16. Longitudinal Multi-level Model for Total Number of Cigarette Displays per Store Predicted by Time and Neighborhood Characteristics, Controlling for Store Type

Level 2 - Fixed Effects				
	Coefficient	Robust Standard Error	t-ratio	p-value
For Intercept				
Intercept	1.90	0.11	16.95	0.000
For Slope (growth rate)				
Intercept	-0.20	0.05	-4.24	0.000
Convenience store with gas	-0.06	0.03	-1.68	0.093
Convenience store without gas	-0.04	0.04	-0.81	0.420
Drug store	-0.29	0.05	-6.27	0.000
Gas only	-0.13	0.04	-3.48	0.001
Liquor store	0.09	0.04	2.28	0.023
Supermarket	-0.16	0.03	-4.62	0.000
Population Density Quartile 4	0.01	0.03	0.30	0.763
Proportion of population under 18 Quartile 2	-0.01	0.03	-0.30	0.764
SES*	-0.03	0.01	-2.74	0.007
High proportion of African Americans	0.05	0.03	1.67	0.096
High proportion of Hispanics	-0.01	0.04	-0.26	0.795
High proportion of non-Hispanic Whites	-0.03	0.04	-0.72	0.471

Variance Components - Random Effects					
		Standard Deviation	Variance Component	Chi-square	p-value
Intercept	μ_0	2.29	5.23	1875.05	0.000
Slope - Year	μ_1	0.42	0.17	1080.53	0.000
Level 1	R	1.64	2.68		

* SES is a composite measure of socio-economic standing; higher scores equal higher socio-economic standing.